Continental J. Biomedical Sciences 9 (2): 7 - 15, 2015
© Wilolud Journals, 2015
Printed in Nigeria
ISSN: 2141 – 419X
http://www.wiloludjournal.com
doi:10.5707/cjbmsci.2015.9.2.7.15

RESEARCH PAPER

INTESTINAL PARASITIC INFECTIONS IN HUMAN IMMUNODEFICIENCY VIRUS (HIV) INFECTED PATIENTS WITH DIARRHEA IN FEDERAL TEACHING HOSPITAL, GOMBE, GOMBE STATE, NIGERIA.

Samaila, A.B. [1], Yarma, A.A[2] and Alli – Balogun, J.A[3]
[1]Department of Biological Sciences, Abubakar Tafawa Balewa University, PMB 0248, Bauchi State, Nigeria.
[2]Yarma Memorial Hospital, Gombe, Gombe State.
[3]Federal Teaching Hospital, Gombe, Gombe Sate.

ABSTRACT

Parasitic infections of the intestinal tract is a major source of disease in patients with HIV particularly in the tropics, with diarrhea as a common complaint with variable severity and specific pathogens identified in more than half of the HIV/AIDS patients presenting diarrhea. This study aimed at determining the prevalence of intestinal parasites in HIV infected patients with and without diarrhea in Federal Teaching Hospital (FTH), Gombe. Of the 319 stool samples, 273 with diarrhea and 126 control samples without diarrhea, were collected and examined for enteric parasites both macroscopically and microscopically, preparation with fresh wet mounts, formal – ether concentration and Modified acid fast stain 56 patients were positive for intestinal parasites. Intestinal parasites were detected in diarrhoeic HIV infected patients 56 (20.5%) while none was found in HIV infected without diarrhea 0(0%). There was no significant difference in the prevalence of parasites among study and control groups ($p<0.05$). Regardless of their diarrhea status, the general prevalence of enteric parasites in HIV infected patients was 56(17.6%). Among the 273 diarrhoeic HIV infected patients, 56(20.5%) were positive while 217(79.5%) were negative for enteric parasites. Out of the 56 with diarrhea 35 (21.7%) and 21(18.7%) were male and female respectively. *G.lamblia* and *Hook worm* was detected in 7(2.6%) cases each, while trophozoites and cysts of *E.histolyticai* were detected in 14(5.1%) and *E.coli* had the highest prevalence with 28(10.3%). *Mocrosporidia* and opportunistic enteric parasites were not detected. This study re-affirms view that intestinal parasites are more prevalent in diarrhoeic HIV infected than non-diarrhoeic HIV infected patients.

KEYWORDS: Parasite, Infection, HIV, Patients, Diarrhoea, Gombe.

Received for Publication: 25/08/15 Accepted for Publication: 30/11/15
Corresponding Author: **adamubsamaila13@yahoo.com**

INTRODUCTION

Human immunodeficiency virus (HIV) infection, a worldwide infection is a serious problem in the present day. A high rate of infection is found in many regions of the world (Surasiengsunk, *et al*., 1998). One of the major health problems among HIV infected patients are superimposed infections due to defect in immunity (Eamsobhana and Boranintra, 1987), due to immunosupression caused by the virus (HIV). Many HIV infected patients are predisposed to enteric infections (Mahandas, *et al*., 2002), which includes intestinal parasitic infectins, which is also one of the basic health problems in tropical regions around the world (Eamsobhana and Boraintr, 1987). Similarly, cases of intestinal parasitic infection in HIV infected patients were reported by other researchers in USA, Africa and also in Brazil (Costa, *et al*., 1996 and Awote, *et al*., 2001).

A prevalence rate of 50% was also reported by Wiwanitkit, (2001) for intestinal parasites among Thai HIV infected patients, and he stated that the importance of tropical epidemic non-opportunistic intestinal parasitic infection among HIV patients should not be neglected. Diarrhea is a common complication of HIV infected patients inducing weight loss and cachexia (Kumar, *et al*., 2002) these was associated. Reports indicate that it occurs in 30-60% of AIDS patients in developed countries and in about 90% of AIDS patients in Haiti and Africa (Keptcheu, *et al*., 2000). Diarrhea, which is a major cause of morbidity and mortality among children in developed countries (Punpoowom, 1998; Caraballo, *et al*., 2001; Moandas, *et al*., 2002; Shah, *et al*., 2003), and in HIV infected patients has been associated with intestinal parasites and these include; *Cryptosporidium parvum, Isospora belli, Entamoeba histolytica, Cyclospara cayetanensis*, and *Giardia lamblia* accounts for a significant number of cases in the Northern Indian population (Mohandas, *et al*., 2002).

The extent to which these parasites may contribute to the etiology of diarrhoeal disease has not been adequately investigated in Nigeria (Adedoyin, *et al*., 1990; Dubey, 1998; Yakubu and Bello, 1998). Since the diarrhoeal illness due to parasitic etiology among HIV patients is on the rise during recent times (Kumar, *et al*., 2002), the present study was undertaken to examine the prevalence of enteric parasites among HIV infected patients with diarrhea at the Federal Medical Center, Gombe. It is also hoped that the documentation of the prevalence will contribute to the knowledge of the occurrence of these enteric parasitic infections in HIV patients in Gombe State.

MATERIALS AND METHODS

Location/Description of the Study Area

The Federal Teaching Hospital (FTH) is the only Tertiary Health Facility in Gombe State and its environs. The FTH is located in the northern part of the town, along Ashaka road approximately three kilometers from the town center.

Sample Collection

A total of 319 stool samples of HIV infected patients with and without diarrhea attending the Tuesday and Thursday HIV clinics at the Medical Out-patient Department, (MOPD) between

February – July, 2004 were examined for enteric parasites. The HIV status of the patients had been confirmed by the hospital using Trinity Biotech Capillus ™ HIV-1/HIV-2 Assay (Biotech, USA). Sterile stool containers were given to the HIV infected patients on their clinic day at the MOPD ward and samples were collected on the morning of the patients next clinic day. Patients passing-out watery stools were advised to pass stools directly into the stool container.

Sample Treatment

The stools not examined immediately after collection were treated and preserved with 10% formalin to preserve eggs, larvae and cysts for direct wet mount examination and with polyvinyl alcohol (PVA) fixative to preserve trophozoites and cysts for permanent stained smears.

Two vials were half filled, one with 10% formalin and the other with PVA – Fixative. A portion of the stool was picked and mixed with the preservatives in each vials, and the vials covered and stored.

Parasitological Examination

Feacal samples were first examined macroscopically for consistency (watery, bloody, mucory, bloody mucory) and then examined by a combination of direct smear, formalin either concentration and modified Ziehl – Nelson techniques for the presence of parasite as described by Cheersbrough (2000). The samples were then smeared on to clean microscope slides, air dried, fixed with 70% methanol for 20 minutes, stained with cold carbon fuschin for 2 minutes and then examined by microscopy for parasite morphological characteristics as described by Cheersbrough (2000).

RESULTS

The age and sex distribution of the study subjects is presented in Table 1. HIV infected patients with diarrhea in the age range of 31-40 among male subjects had the highest prevalence of parasitic infections, 14 (20%), but with respect to the percentage of subjects examined in each age group among males, the age range between 41-50 had the highest prevalence of parasites 7(50%) of the subject tested.

The females in the age range of 0-10 had the highest prevalence, both in the number presenting intestinal parasites and in the percentage of subject tested, 14 (66.7%) compared to others. Males were more infected than females with 35 (21.7%) and 21 (18.7%) respectively.

Table 1: Age and Sex distribution of diarrheal and control cases

Age group	Diarrheal patients n=273					Non-Diarrheal patients (control) n=126				
	No (%)					No (%)				
	M=161 No Examined	+	F=112 No Examined	+	Total No. Examined	M=70 No Examined	+	F=56 No Examined	+	Total No. Examined
0-10	21	0(0%)	21	14(66.7%)	42	21	0(0%)	14	0(0%)	35
11-20	7	0(0%)	-	-	7	14	0(0%)	7	0(0%)	21
21-30	28	7(25%)	56	7(12.5%)	84	21	0(0%)	28	0(0%)	49
31-40	70	14(20%)	28	0(0%)	98	-	-	-	-	--
41-50	14	7(50%)	7	0(0%)	21	7	0(0%)	-	-	7
>51	21	7(33.3%)	-	-	21	7	0(0%)	7	0(0%)	14
	161	35(21.7%)	112	21(18.7%)	273	70	0(0%)	56	0(0%)	126

N.B: M-males, F-females

Intestinal parasites were not observed in the non-diarrheal HIV infected patients used as control. Among the 126 subjects examined, all were negative for intestinal parasites in contrast to the test subjects.

The Table 2 shows an extract from Table 1 for the prevalence of intestinal parasites according to the sex of test subjects. Out of the 161 male examined, 35(21.7%) were positive for enteric parasites, but in relation to the total number of test subjects, both male and female (273), 12.8% were male and 7.8% were female. Some 21 (18.7%) of the 112 female examined were positive for enteric parasites.

Table 2: Prevalence of intestinal parasites according to sex of test subjects

Gender	Number examined	Number + in each gender (%)	% Related to total test subjects
Male	161	35 (21.7%)	35 (12.8%)
Female	112	21 (18.7%)	21 (7.8%)
Total	273	56(20.5%)	56(20.5%)

The Table 3 shows an extract from Table 1 on the prevalence of enteric parasites in relation to age of test subjects and the number negative for enteric parasites.

The percentage negative for intestinal parasites were greater than those positive with 79.5% and 20.5% respectively. The age ranges with the highest number of negative subjects are 11-20, 31-40 and 21-30 with 100%, 85.7% and 83.3% respectively. The other 3 age ranges were the same at 66.7%.

Table 3: Prevalence of Intestinal parasites in relation to age of test subjects

Age group	**Number examined**	**Number positive (%)**	**Number negative (%)**
0-10	42	14(33.3%)	28(66.7%)
11-20	7	0(0%)	7(100%)
21-30	84	14(16.7%)	70(83.3%)
31-40	98	14(14.3%)	84(85.7%)
41-50	21	7(33.3%)	14(66.7%)
>51	21	7(33.3%)	14(66.7%)
Total	273	56(20.5%)	217(79.5%)

Table 3 shows the prevalence of specific intestinal parasites observed in diarrheal test patients and controls.

Single enteric parasites were detected in 56 patients and protozoan infections was more frequent than helminthes 49 (18.0%) and 7(2.6%). Cyst of *Entamoeba coli* had the highest detection with

28(10.3%), followed by *Entamoeba histolytica* 14(5.1%), *Giardia lamblia* 7(2.6%) and *Hookworm* 7(2.6%).

The opportunistic coccidian parasites were not detected in the study as well as *Ascari, lumbricoides* and *Strongyloides stercoralis*.

The 2 nuclei rounded immature cyst and trophozoites of *E.histolytica* were detected in equal proportion. Only the thick walled 4 nuclei cyst of *G.lamblia* was detected. Also the barrel-shaped eggs of *hookworms* were identified.

Table 4: Prevalence of specific intestinal parasites in Diarrheal patients and controls

Parasites	**HIV + patients with Diarrheal No (%)**	**Control No. (%)**
Entamoeba coli	28(10.3%)	-
Entamoeba histolytica	14(5.1%)	-
Hook worms	7(2.6%)	-
Giardia lamblia	7(2.6%)	-
Isospara belli	-	-
Cryptosporidium parvum	-	-
Cyclospora cayetanensis	-	-
Ascaris lumbricoides	-	-
Strongyloides stercoralis	-	-
Total	56(20.5%	0(0%)

DISCUSSION

The prevalence of intestinal parasites is highest in the age group of 31-40 for males, 14(20.0%) and lowest in the age range 0 – 20 (0%). The age group with the highest percentage with respect to the number examined is 41-50 with 50% of the test subject positive. This is confirmed by the work of Keptcheu *et al* (2000).

Among female test subjects, the age group 0 - 10 had the highest prevalence 14 (66.7%) while the ages range 31 and above had the lowest prevalence of 0(0%). The results of the study supports the view held about adult African patients that common gut parasites do not occur at a higher frequency in HIV positive individuals.

The males were predominantly more infected than the females, 35(21.7%) and 21(18.7%) respectively, with enteric detection in almost all the age group except 0 – 20 ($p<0.05$). The treatment produced statistically insignificant differences among the groups.

The study has clearly shown that apart from the non-opportunistic parasites, HIV patients are not more susceptible to intestinal parasitism as compared to the HIV patients with diarrhea. The negative result exhibited by the control subjects gives credence to the fact that the diarrheal status of the test subjects were due to intestinal parasites after the Microscopy, Culture and Sensitivity (MCS) test had been carried out.

Low prevalence rates was also not unexpected in the subjects examined, because the majority of patients attending the clinics were either on immune boosting drugs like Levamisol ® or were already taking antibiotics to combat the gastrointestinal (GI) infections, due to counseling from doctors on taking prompt action to stem any infection considering the patients HIV status and increased awareness on HIV/AIDs by different aids groups and non-governmental organizations (NGO's).

Also shown, is the fact that 56(20.5%) of the 273 diarrheaic HIV patients were positive for intestinal parasitism, while the majority, 217 (79.5%) were negative. This may be due to the fact that the causative agents in HIV/AIDs associated diarrhea include an array of bacterial (*Salmonella, Shigella, Campylobacter*); Mycobacterial (*Mycobacterial tuberculosis, M. avium complex* (MAC); viral *Cytomegalovirus*); and parasitic infections as well as drugs, but since the bacterial infections have been ruled out by the Microscopy, Culture and Sensitivity (MCS) test, then the diarrhea (certain antiretroviral such as protease inhibitors e.g. Nelfinavir) or idiopathic diarrhea, often labeled HIV enteropathy (Chiutu, *et al.*, 1995).

Overall, the prevalence rate in male subjects examined was higher than the female subjects examined 35(12.8%) and 21 (7.8%) respectively. Also, all opportunistic coccidian parasites such as *C.parvum, I.belli,* and *C.cayetanensis* oocysts were not detected in the diarrhoeic HIV patients, but the prevalence of non-opportunistic parasites such as *E.coli* 28(10.3%), *E.histolytica* cyst and trophozoites 14(5.1%), *G.lamblia* 7(2.6%) and *Hookworms* 7(2.6%) were recorded and this is backed by the findings of Cimerman *et al* (2001).

The work of Awole, *et al*., (2001) also showed that opportunistic coccidian were common only in HIV infected patients with chronic diarrhea and with late stage HIV infection or already developed AIDS and this is in line with the findings here as none of the opportunistic coccidians were detected in this study.

The other protozoan infections have been found to be opportunistic in HIV infected patients because there is no evidence for an increased prevalence as observed also in this study or any altered natural history of these parasites in HIV patients despite the fact that important immune defenses against them may be expected to be deranged by HIV infection (Awole *et al*., 2001).
Although concurrent infections of helminthes and viruses are common, with the exception of *S.stercoralis*, previous reports did not show any interaction between HIV and helminthic infection (Fisseha *et al*., 1999; Caraballo *et al*., 2001).

ACKNOWLEGEMENT

We are grateful to the authorities of Federal Teaching Hospital Gombe, Gombe State for their permission to do this work. We also acknowledge the Abubakar Tafawa Balewa University, Bauchi, Nigeria for use of Laboratory facilities.

REFERENCES

Adedoyin, M.A., Awogun, L.A. and Juergensen, T. (1990). Prevalence of intestinal parasitosis in Relationship to Diarrhoea among children in Ilorin. *West African Journal of Medicine,* 9(2): 83-88.

Awote, M., Gebre – Selassie, S., Kassa, T. and Kibru, G. (2001). Prevalence of intestinal parasites in HIV infected adult patients in Southwestern Ethiopia. *The Ethiopian Journal of Health Development*, 17:70-77.

Caraballo, A.; Orozco, I and Munoz, L. (2001). Intestinal Parasitic Infections in human immunodeficiency virus (HIV) positive individuals in southeastern Venezuela. *Boletin Chileno de Parasitologia,* 57:3-4.

Chessbrough, M. (2000). District Laboratory Practice in Tropical Countries, Part 2. 2nd ed. Cambridge University Press, UK.

Chiutu, C.; Luo, C; Baboo, S.; Khunmlo-Ngweriya, B; Matthewson, J; Dupout, H.L.; and Zumla, A. (1995). Intestinal parasites in HIV – Seropositive Zambian children with Diarrhoea. *Journal of Tropical Pediatrics,* 41: 149-152.

Cimerman, Sergio, Castaneda, Carlos G., Luliano, and Assuncao, W. (2002). Profile of Intestinal parasites Diagnosed in infected patients in the Haart Era at a reference center in Sao Paulo, Brazil. *Parasitologia latinoamericana,* 57 (304): 111-119.

Costa-Cruz, J.M., Ferreira, M.S. and Rossin, I.R. (1996). Intestinal Parasites in AIDs and +HIV patients in uberlandia, minas Gerais, Brazil. *Merorias do Instituto Oswaldo Cruz On-line,* 91(6): 685-686.

Dubey, J.P. (1998). Parasitology. In: Topley and Wilson, Microbiology and Microbial infections. (J.P. Kreir, D. Wakelin eds) FED Cox, 9th ed. Arnold, London, pp 325-326.

Eamsobhana, P. and Borainntra, K. (1987). Identification of Intestinal parasites in the quality assessment Programme for the year 1984- in Thailand. *Journal of Medical Association,* 72:11-15.

Fisseha, B., Petros, B., Woldemichael, T. and Mohammed, H. (1999). Diarrhoea Association Parasitic infectious agents in AIDs patients within selected Addis Ababa Hospitals. *Ethiopian Health and Nutrition Research Institute*, 13(3): 169-74.

Keptcheu, D.L., Elelwa, D. and Ikeh, E. I. (2000). Prevalence of Intestinal Parasites in HIV Patients in Jos, Nigeria. Department of Medical Microbiology Jos, 9:26-29.

Kumar, S.S., Ananthan, S. and Lakshmi, P. (2002). Intestinal Parasitic Infection in HIV Infected Patients with Diarhoea in Chennai. *Indian Journal of Medical Microbiology*, 20(2): 88-91.

Mohandas, K., Sehgal, R., Sud, A. and Malla, N. (2002). Prevalence of Intestinal parasitic Pathogens in HIV – Sero Positive individuals in Northern India. *Jpn. J. Infect. Dis.,* 55:83-84.

Punpoowong, B. *et al*., (1998). Opportunistic protozoa in stool samples from HIV infected patients. *Southeast Asian J. Trop Med Public Health*, 29:31-34.

Shah, U.V., Purohit, B. C., Chandralekha, D. and Mapara, D. 2003). Co-infection with *Crypotosporidium, Isospora* and *S.stercoralis* in a patient with AIDs. *Indian Journal of Medical Microbiology*, 21:2.

Surasiengsunk, S. *et al*., (1998). Demographic Impact of the HIV epidemic in Thailand, 12:775-784.

Wiwanitti, V. (2001). Intestinal parasitic infections in Thai HIV infected patients with different immunity status. *BMC Gastroenterology*, 1:3.

Yakubu, A.M. and Bello, C.S.S. (1998). Bacterial and Parasitic agents in diarrhoeal stools in Zaria. *Parasitology* 10(9): 249-251.